

Trialling axiophytes on a Scottish island

Angus Hannah

The idea of axiophytes was nurtured in the soil of lowland England; how would it fare when transplanted to a Scottish island? As a result of my recording there over the last ten years, the island of Bute offered an opportunity to find out. The island comprises 153 monads with a significant land area, and an average of just over 200 species have been recorded in each within the last decade. Also available were species lists for 430 (mostly) small plots, chosen partly as habitat samples and partly to record associates of some interesting species.

The first step in compiling an axiophyte list is to select habitats 'of conservation interest' in one's locality. In the case of Bute, I defined these very broadly, and listed species typical of the following:

- Fresh water (still or slow: aquatic/emergent plants)
- Cultivated/disturbed ground/open vegetation (nutrient rich)
- Coastal (saline, including sandy, shingly and rocky shores)
- Marsh and fen
- Bog/wet heath
- Flushes and wet rock (mostly base-rich, at least slightly)
- Dry rock/turf/moorland (mostly acid, but including some calcareous exposures; nutrient poor)
- Shade (woodland/bracken/ravines/block scree)

Most of the local natives and archaeophytes, and a handful of neophytes, figured on one or other of these lists (a few more than once), the exceptions being ruderal plants not typical of any specific habitat, and those of such broad ecological amplitude that they are common nearly everywhere.

According to the BSBI guidelines, axiophytes should be selected from these lists by eliminating those species which are too common, to be precise, those found in more than 25% of tetrads in the county. In the present case, this might equate to 25% of monads on the island, at least for a first approximation. But a question was raised as soon as this rule was applied. An axiophyte list selected in this way is unable to identify any habitat, however good, which is too frequent locally, since many of that habitat's indicator species will have been ruled out of the local axiophyte list by the 25% bar. On Bute, samples of bog and wet heath are found in 65% of monads, and characteristic species of the habitat such as *Erica tetralix*, *Narthecium ossifragum*, *Eriophorum angustifolium*, *Viola palustris*, *Pedicularis sylvatica*, *Dactylorhiza maculata*, *Drosera rotundifolia* and *Trichophorum germanicum* all occur over 50% of monads. These and others would therefore be disqualified, leaving the habitat with a short axiophyte list of relatively uncommon species. All squares consisting largely of bog would have a low axiophyte score. But the fact that a good habitat is widespread locally does not reduce its inherent value. On the contrary, its conservation value may be increased by the very fact that it is extensive enough to support sustainable populations, not only of plants but more generally.

This problem has not been addressed because (I suspect) the concept of axiophytes was developed in lowland England, where it is a safe assumption that good habitat will not be widespread. It is a problem we have to think about in Scotland especially (but one we may be glad to have!). A possible solution is to adjust the bar selectively, so that in the case of the most widespread habitats, axiophytes may be admitted with up to 50%, or even 65% tetrad scores, as in the above case, while retaining a 25% (or even lower) limit for less frequent habitats. In fact, the axiophyte list used to generate the maps did not include any of the above-mentioned species, though the bar was raised to 50% for the more widespread habitats. Further experimentation and fine-tuning of the selection procedure might be worthwhile.

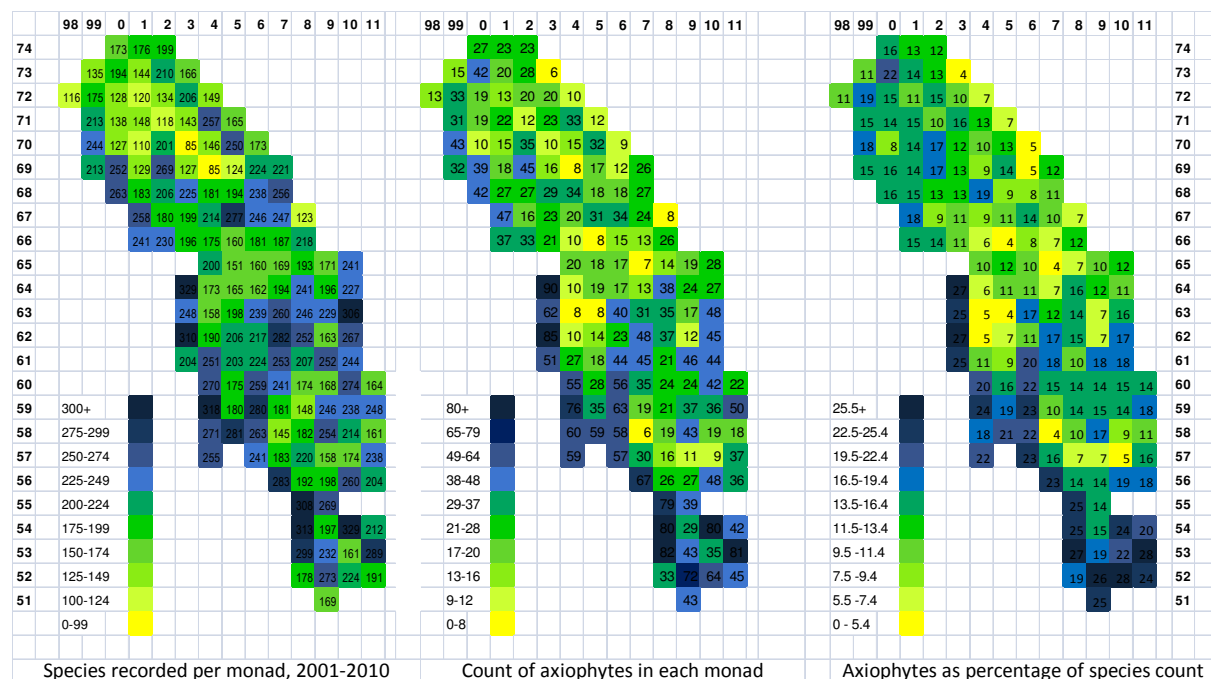


Figure 1: species richness vs axiophyte richness in each monad on Bute.

The maps show how axiophyte analysis works in an area that is well-recorded. Map 1 (on the left) plots species diversity within each monad; this indicates the variety of habitats present, and to a lesser degree, their species richness. Map 2, showing the number of axiophytes present, shifts the balance so that roughly equal weight is given to both these factors. Map 3, plotting axiophytes as a percentage of all species recorded in each square, is the most useful. Not only does it allow ‘fair’ treatment for partial squares at the margins, it eliminates altogether the variety factor, and focuses entirely on quality of habitat, so that squares with a single, relatively species-poor plant community may still score highly if the habitat is a good example of its kind.

A general glance at the maps will reveal that some squares in the north of the island, which score lowest of all on map 1, look less bad on map 2 and on map 3 score averagely. This is hill ground of no particular interest, but deserving to score more highly than the improved agricultural land in the central section of the island, which shows up yellow (poor) on map 2 and even more clearly on map 3, despite appearing of moderate richness on map 1. The best areas of Bute, the southern extremity and the shore in the mid-west, show up more distinctly on map 3. Conversely, the square 1063, midway up the east coast, promises well on map 1, with over 300 species recorded, but is seen on map 3 to be unremarkable, the high score being due to a rich variety of habitats in close proximity, rather than any of outstanding merit.

In general, map 3 conveys an accurate impression of the botanical quality of different parts of the island, and demonstrates the validity and usefulness of axiophyte analysis. However, it is only fair to point out that good general recording throughout the survey area is a prerequisite of this work, since the results would be skewed by any squares where records were deficient.

Analysis of species lists from the sample plots also provided some interesting results. About 50% had 0-1 axiophyte, while about 10% had 8 or more (up to 11). Most of these latter plots had 30-40 species in all, and so the axiophyte percentage was in the region of 25-30 (i.e. comparable to the best monads). These plots represented good examples of most of the habitat types initially selected. One outstanding plot had 20 axiophytes out of a total of 52 species, and indicated a site that clearly deserves monitoring.